PROCEEDINGS OF THE

ENTOMOLOGICAL SOCIETY OF WASHINGTON

Vol. 71 MARCH 1969 No. 1

A NEW SPECIES OF ARENIVAGA FROM DESERT SAND DUNES IN SOUTHERN CALIFORNIA[1,2]

(DICTYOPTERA: POLYPHAGIDAE)

JAMES J. FRIAUF[3] *and* E. B. EDNEY[4]

ABSTRACT—*Arenivaga* **investigata,** n. sp., is described and illustrated from Palm Springs, Riverside Co., California.

A revision of the genus *Arenivaga* Rehn, 1903 is being undertaken by one of us (J.J.F.), but in view of the fact that the present species is the subject of physiological study (Edney, 1966, 1968), we have decided to name and describe it ahead of time. The taxonomic affinities of the present species will be considered when the complete revision is published.

Males and females ascribed here to the same species have been observed by Mr. David Gibo *in copulo*. Both sexes occur in large numbers at the type locality together with immatures of all stages, and only one male of another species has ever been caught there. Consequently, we feel justified in concluding that the sexes here described are indeed conspecific.

The collection of Ernest Tinkham and his recognition of the distinctiveness of this cockroach have contributed in large measure to the description of this species.

Arenivaga investigata, n. sp.

(Figs. 1, 2)

Holotype male and allotype female: Palm Springs, Riverside County, California, June 8, 1968. Holotype and allotype in the Academy of Natural Sciences, Philadelphia. Sixty-four paratypes (31♂♂, 33♀♀) are included in the type series.

Individuals of *Arenivaga erratica* Rehn, 1903, and *A. apacha* (Saus-

---

[1] Immediate publication secured by full payment of page charges—Editor.

[2] Supported in part by National Science Foundation Grant No. GB-6279 to E. B. E.

[3] Department of General Biology, Vanderbilt University, Nashville, Tennessee 37203.

[4] Department of Life Sciences, University of California, Riverside, California 92502.

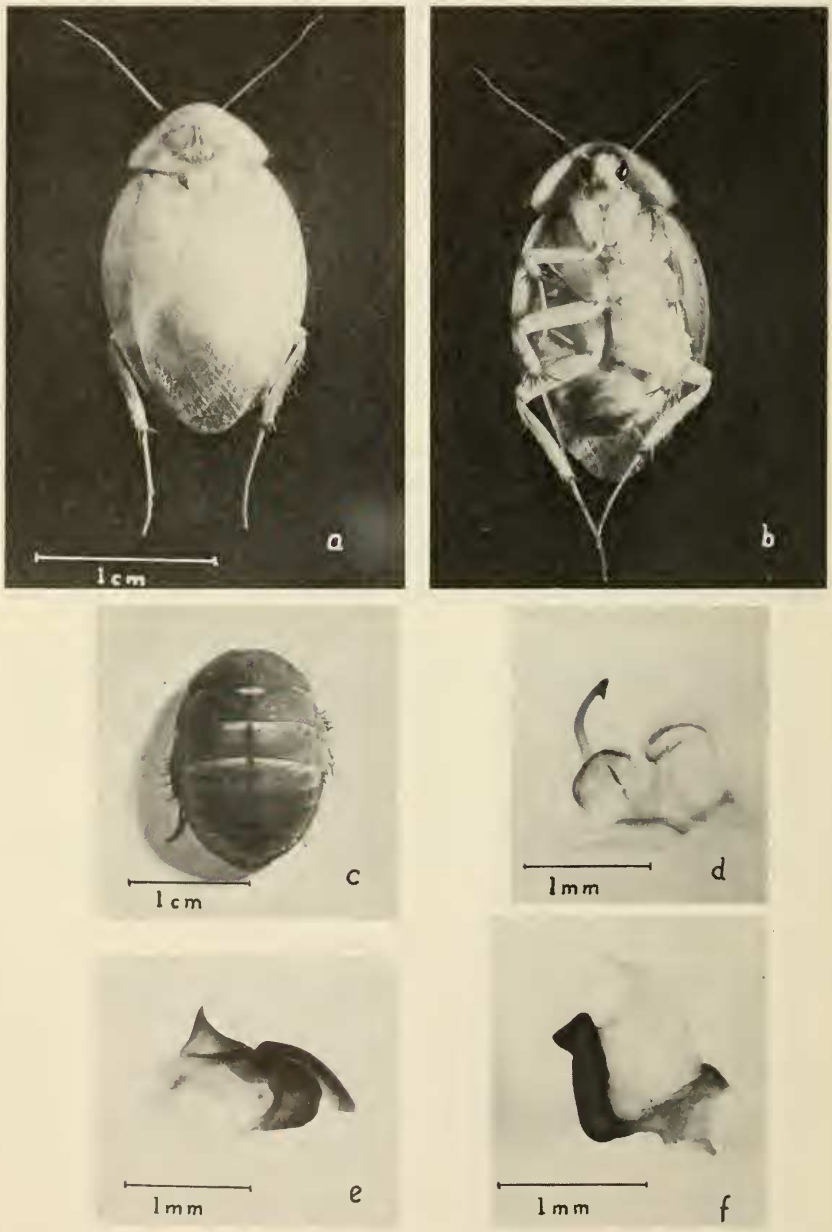

Fig. 1, *Arenivaga investigata*, n. sp.: a, dorsal view, adult ♂; b, ventral view, adult ♂; c, adult ♀; d, left genital hook, ♂; e, right ventral phallomere, showing posteriorly directed mesal spinous process; f, right dorsal phallomere, showing meso-ventrally directed process and hook.

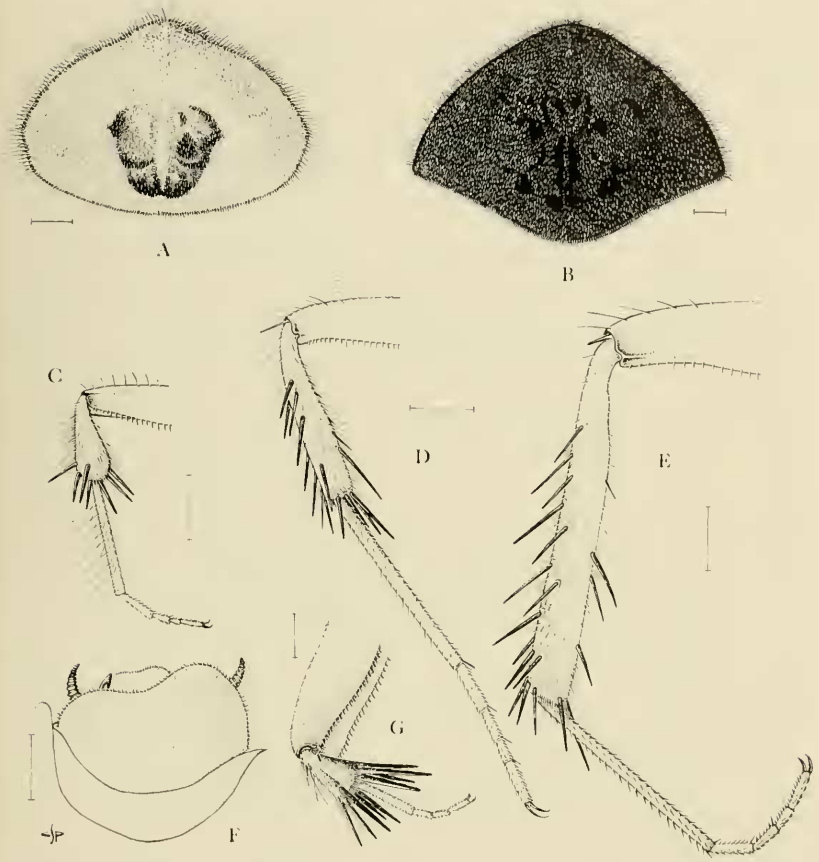

Fig. 2, *Arenivaga investigata*, n. sp.: a, pronotum, adult ♂; b, pronotum, adult ♀; c, front leg, ♂; d, middle leg, ♂; e, hind leg, ♂; f, ♂ hypandrium, also showing genital hook and cerci; g, front leg, ♀. (Scale indicators = 1 mm.)

sure), 1893, have been confused with the species now to be described. Examination of the male genitalia will, however, separate them easily. In *A. erratica* the two dorso-anteriorly directed spinous processes from the meso-dorsal border of the right dorsal phallomere, and the very differently shaped right ventral phallomere are sufficient for differentiation. The rather deeply concave posterior face of the right ventral phallomere, and the conspicuous sharp-pointed process at the dorsal end of the middle lobe of the phallic complex of *A. apacha* readily separate that species from *A. investigata*. The proportions of the tegmina (width/length = 0.50 ± 0.017) distinguish *A. investigata* from another closely related species to be described later, whose tegmen ratio is 0.40 ± 0.006.

Table 1. Measurements of *Arenivaga investigata* in mm. Lengths of the leg podomeres exclude terminal spines.

			31 males				33 females		
		Holotype male	Mean	Range	Standard error	Allotype female	Mean	Range	Standard error
1.	Length of pronotum	5.0	4.6	3.9 – 5.6	0.07	6.65	6.1	5.1 – 6.7	0.08
2.	Width of pronotum	7.8	7.5	7.0 – 8.3	0.06	9.9	9.2	7.8 – 10.8	0.11
3.	Ratio of 1 : 2	0.64	0.60	0.53 – 0.68	0.006	0.67	0.66	0.56 – 0.74	0.005
4.	Interocellar distance	0.65	0.7	0.6 – 0.8	0.01				
5.	Interocular distance	0.55	0.6	0.5 – 0.8	0.01	1.8	1.7	1.5 – 1.8	0.01
6.	Width of head	2.6	2.7	2.5 – 2.9	0.02	3.8	3.6	3.1 – 4.0	0.03
7.	Ratio of 5 : 6	0.21	0.21	0.20 – 0.28	0.003	0.47	0.48	0.44 – 0.52	0.004
8.	Width of tegmen	6.9	6.4	5.6 – 7.3	0.10				
9.	Length of tegmen	13.8	12.3	11.6 – 13.9	0.13				
10.	Ratio of 8 : 9	0.50	0.50	0.46 – 0.60	0.017				
11.	Length of front tibia	1.65	1.6	1.3 – 1.7	0.02	2.0	1.9	1.4 – 2.1	0.02
12.	Length of front femur	3.2	3.2	3.0 – 3.5	0.02	3.55	3.3	2.9 – 3.7	0.03
13.	Ratio of 11 : 12	0.52	0.49	0.42 – 0.55	0.006	0.56	0.57	0.48 – 0.62	0.009
14.	Length of middle tibia	3.0	2.8	2.5 – 3.1	0.03	2.6	2.5	2.2 – 3.0	0.04
15.	Length of middle femur	4.2	4.2	3.8 – 4.4	0.03	4.5	4.2	3.6 – 4.6	0.04
16.	Ratio of 14 : 15	0.72	0.68	0.59 – 0.72	0.008	0.58	0.6	0.50 – 0.72	0.002
17.	Length of hind tibia	5.2	5.3	4.7 – 5.8	0.05	4.8	4.4	3.7 – 5.1	0.05
18.	Length of hind femur	4.35	4.1	3.8 – 4.4	0.03	4.75	4.5	3.8 – 5.0	0.04
19.	Ratio of 17 : 18	1.2	1.18	1.06 – 1.27	0.009	1.01	0.99	0.89 – 1.10	0.002

Description of the Male Holotype

Size about average for the genus, approximately that of *A. erratica* and *A. apacha*. Shortest interocular distance, which is on the vertex, 0.5 mm; interocellar distance 0.60 mm; width of head 2.6 mm. Interocular area almost flat frontally, convex sagittally, with four shallow transverse wrinkles on each side of the midline. Ocelli of the usual broadly oval shape and prominence; interocellar area of the frons shallowly and broadly concave, relatively smooth, and its lateral edges below the ocelli more prominent; clypeus and labrum of the usual form for the genus.

Pronotum elliptical (fig. 2a), convex over the head and anterior thorax, 5.0 mm long and 7.8 mm wide, its anterior margin with rather long setae evenly spaced with shorter ones, the setae increasing distinctly in length laterally towards the widest part of the pronotum; posterior marginal setae very short. Setae are also present on the disc of the pronotum, those immediately behind the anterior border being longer and more densely distributed.

Wings 0.9 mm longer than the tegmina, extending beyond the end of the abdomen by 1.3 mm. Tegmina (fig. 1a) 13.8 mm long and 6.9 mm wide, their apices broadly and evenly rounded.

The exposed portion of the hypandrium, in normal position, has a general outline as shown in fig. 2f. Length on the right side 1.4 mm, on the left 0.9 mm, width 2.9 mm; the relative lengths and distribution of the setae on this sclerite similar to the other species in the genus. Cerci with 10 visible segments.

Some components of the concealed genital complex are shown in fig. 1, d-f. The bulbous right dorsal phallomere with a meso-ventrally projecting process which bends abruptly dorsad to form a sharp-pointed, hook-like structure similar to that in *A. genitalis* Caudell, 1918. The independent dorsal plate from the right dorsal phallomere rather heavily sclerotized, more so basally and distally along the ventral margin, strongly concave ventrally, bending ventrally more sharply near the distal one-third. The ventral face of the right ventral phallomere flattened to slightly convex, its posterior surface sloping dextro-laterad to a more prominent, posteriorly directed arcuate lobe. The most conspicuous structure on the right ventral phallomere is a somewhat laterally flattened, posteriorly directed, mesal spinous process, which is distinctive for this species.

Vertex of the head very pale ochreous, with darker margins and lateral ridges; ocelli very light amber; eyes black in life but becoming golden brown with black streaks and blotches after death and drying; frons and clypeus opaque and cream colored, the lateral ridges of the upper portion of the frons light tan; labrum darker—yellow brown. Antennae and the under surface of the body ochreous, somewhat paler in life; leg spurs distinctly darker than the rest of the legs. Pronotum, except for the disc, rather translucent, but with an opaque white deposit in each lateral half below the cuticle; the usual disc pattern of orange and brown with darker tentorial spots present. A thin orange line on each tegmen runs from the middle of the anal margin rather sinuously to the distal end of the costal margin, and a similar but shorter line runs transversely across each wing near the distal margin. In dry specimens these lines tend to fade.

Subcostal vein of the tegmina reddish brown at the base, the remainder of the tegmina and wings mostly translucent and nearly colorless. Small opaque white areas occur along the basal portion of the subcostal vein, and distally near the costal margin. These white areas, together with those in the pronotum and

elsewhere on the ventral surface of the body are deposits of uric acid (kindly identified as such by Dr. Vaughan Shoemaker). Costal margin of the tegmina bearing long golden brown setae.

Description of the Female Allotype

Generally nymphlike. Vertex of the head smoothly rounded, clypeus with a feeble median longitudinal groove, eyes narrowly kidney-shaped, ocelli absent, antennae shorter than those of the male. Pronotum elliptical (fig. 2b), convex transversely and longitudinally, its anterior and lateral margins with a fringe of long and short setae as in the male. Abdomen with ten visible tergites, cerci very short, composed of about ten segments. Tegmina and wings absent. Posterior margins of each thoracic tergite with a fringe of short setae. The surface of each thoracic tergite bears a sparse covering of short setae; the abdominal tergites nearly glabrous on the disc, becoming more setaceous laterally, their lateral margins with longer, and their posterior margins with much shorter, setae.

Color in life generally dark reddish brown, the head ochreous, the frons between the eyes yellowish with a small area corresponding to each absent ocellus nearly white; labrum darker—muddy grey; eyes black. Antennae and ventral surface of the thorax light reddish brown, becoming darker posteriorly on the abdomen. Patches of white uric acid deposits are present below the cuticle laterally on the thorax, and on much of the ventral surface. Spines on the legs dark reddish brown, nearly black apically. Setae generally golden brown.

Variability from the Type Specimens

Variability in respect of measurements in table 1. There is little variability so far as shape and sculpture are concerned. As regards color, dead, dry male specimens are distinctly darker than living ones, but the effect is less marked in females. Apart from this, there is some variability in the extent and darkness of the colored patterning on the pronotum, particularly in males, and there is considerable variability in the amount and distribution of the opaque white areas (uric acid) on the tegmina and wings. These are usually associated with branches of the subcostal and radial veins.

The male hypandrium is always longer on the right than on the left side, but there is considerable variability in these lengths owing to different degrees of protraction of that sclerite.

In females, fully hydrated specimens in the laboratory are longitudinally extended, so that the overall length to width ratio is greater than it is in dehydrated specimens; for this reason, that ratio is unreliable. In hydrated females the light colored bases of the thoracic and abdominal tergites are exposed.

Distribution

So far the known distribution of this species is limited to the Coachella Valley in southern California. The type locality is at "Windy Point" in sand dunes at the foot of the San Jacinto mountains, six miles west of Palm Springs on California Highway 111. The species

extends east towards Indio, but it is there replaced by a related species to be described in the forthcoming revision of the entire genus.

References

Caudell, A. N. 1918. Two new species of the blattid genus *Arenivaga* (Orth.). Proc. Ent. Soc. Wash. 20(7):154–157.

Edney, E. B. 1966. Absorption of water vapor from unsaturated air by *Arenivaga* sp. (Polyphagidae, Dictyoptera). Comp. Biochem. Physiol. 19: 387–408.

————. 1968. The effect of water loss on the haemolymph of *Arenivaga* sp. and *Periplaneta americana*. Comp. Biochem. Physiol. 25:149–158.

Rehn, J. A. G. 1903. A revision of the orthopterous genus *Homocogamia*. Proc. Acad. Nat. Sci. Phila. 55:177–192.

Saussure, H. de 1893. Revision de la Tribu des Heterogamiens (Orthopteres de la Famille des Blattides). Rev. Suisse Zool. 1:289–318.

RECORD OF THE MOTH EAR MITE, DICROCHELES PHALAENODECTES, IN OHIO[1]

(Acarina: Mesostigmata)

V. Prasad, *Biology Department, Wayne State University, Detroit, Michigan 48202*

ABSTRACT—The moth ear mite, *Dicrocheles phalaenodectes* (Treat) is reported from Ohio. The adult specimens show some variation in number of setae on the dorsal shield and in the setae on dorsal membranous integument.

Since the original description of *Dicrocheles phalaendotectes* (Treat) in 1954 from the moth, *Pseudaletia unipuncta*, collected in Tyringham, Massachusetts, this mite has been reported from several States of this country (Treat, 1955). However, no record of this moth ear mite is known from Ohio State. Recently, I had an opportunity to collect two dead moths (*Leucania unipuncta*) on the campus of Ohio State University, Columbus, that yielded several immature and adult stages of *D. phalaenodectes*. Only the left ear of both moths was found infested with this mite, the right ear being normal and without any mites. One moth had 73 eggs, 2 larvae, and 5 females; the other moth had 92 eggs, and 4 females. Very light feeding punctures were visible in the ears.

The adult females of the present collection differ from each other in the number of setae on the dorsal shield and on the dorsal mem-

[1] Contribution no. 227 of Biology Department, Wayne State University, Detroit, Michigan.